

REMARKS

Upon entry of the Amendment, which is respectfully requested, claims 1-16 will pending in the present application.

Claims 13-16 are added. Support for the claims can be found at least at page 11, line 21 to page 12, line 7.

No new matter is added.

Response to Rejection Under 35 U.S.C. § 103

Claims 1-12 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Cohen et al. (U.S. Patent No. 5,993,697).

Applicant respectfully traverses.

Cohen discloses a method of formation of a metallic, electrically-conducting material comprising primarily carbon atoms arranged in a two dimensional configuration of five and seven membered carbon rings. Adjacent dangling bonds in the graphite structure, having hexagonal carbon rings, are bonded to each other. There are no external atoms or molecules introduced into the cavities formed as a result of the bonding between the above mentioned dangling bonds.

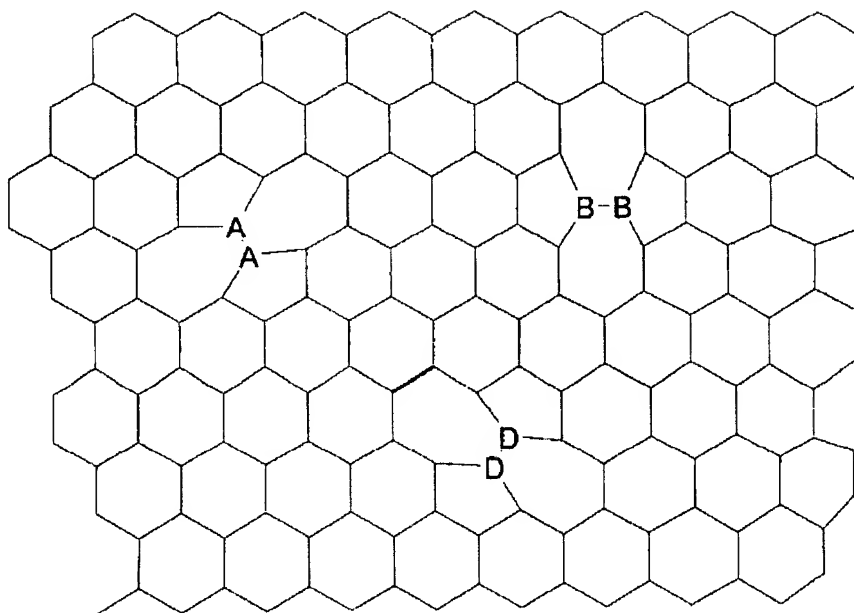
In contrast, as claimed in present claims 1 and 2, graphite-like layered material with high chemical reactivity is prepared by reacting dangling bonds adjacent to a vacant site in the graphite lattice with each other to create a site for the introduction of a divalent atom or molecule. Thereafter, a molecule or an atom constituting the graphite-like layered material is introduced into the site formed as a result of bonding of adjacent dangling bonds, and a bond is formed between the introduced atom or molecule and the graphite-like layered material. As

stated at page 3, lines 12-19 of the present specification, once the introduced atom or molecule is bonded to the base material, a metastable structure is formed. The metastable structure is structurally relaxed, and therefore forms a structure having high chemical reactivity without any use of chemical modifications with an element other than the components of the graphite-like layered material. This is in sharp contrast to the invention of Cohen which insisted on rotation of pre-existing C-C bonds occurring on the perfect crystal of graphite.

Since Cohen does not teach or suggest the introduction of an atom or molecule to the graphite-like material, even if a person of ordinary skill were to employ the process of Cohen, he would not arrive at the present invention, *i.e.*, a metastable structure having high chemical reactivity, with a reasonable expectation of success.

Applicant respectfully submits that a further distinguishing feature of the presently claimed invention is as follows.

In the process for preparing a reactive graphite-like layered material, an introducing site as shown in Figure 3 is tentatively formed by removing a C-C moiety from the graphite structure. After that, a C₂ molecule is introduced into the introducing site in a specific orientation as shown in Figure 4 so as to form the metastable structure that is shown in Figure 5. Therefore, the metastable structure consisting of two pairs of pentagons and heptagons (pentaheptide) is locally placed in the graphite plane. For instance, such three independent sites of the metastable structure as illustrated in the following drawing can be introduced in the graphite plane. The orientation of the site indicated by A-A is quite different from the orientations of the site indicated by B-B or of the site indicated by D-D.



In contrast, in the process for the formation of the metallic carbon material as disclosed in Figure 1 of Cohen, the planar unit composed of four hexagons (graphite) is converted into such a planar unit composed of two pairs of pentagons and heptagons (pentaheptide) through in-plane rearrangement of the C-C moiety by in-plane rotation. Therefore, all the graphite structure is synchronously converted to the planar pentaheptide structure as shown in Figure 1 of Cohen. As a result, in the case of the metallic carbon material as disclosed in Figure 1 of Cohen, all of the planar units composed of two pairs of pentagons and heptagons (pentaheptide) have the same orientation.

In view of the above, claims 1 and 2 are patentable over Cohen. Claims 3-12 are therefore, also patentable, at least by virtue of their dependence from claims 1 and 2. Therefore, Applicant respectfully requests the reconsideration and withdrawal of the §103 rejection of claims 1-12.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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CUSTOMER NUMBER

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